

Environment and Agency in the Ancient Maya Collapse

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For nearly a century, hypotheses about the causes of the Terminal Classic lowland Maya collapse of the ninth century A.D. have reflected contemporary concerns. Recently, a number of environmental scientists and archaeologists have evoked climate change and drought to explain the Maya collapse and a number of other periods of decline or abandonment in Maya history. In this paper, I suggest that many of the arguments about drought and collapse simplify or misrepresent the archaeological data. Closer collaboration between physical scientists and archaeologists is needed to better align the paleoclimate data with current archaeological evidence.

1. INTRODUCTION

For nearly a century, hypotheses about the causes of the Terminal Classic lowland Maya collapse have reflected contemporary concerns about issues as diverse as deforestation and political revolution [Huntington, 1917; Wilk, 1985]. Since the mid-1990s, so many people have evoked climate change and drought to explain a number of periods of decline or abandonment in Maya history that the list of relevant references is now too long to be cited here (for a fairly comprehensive list of sources see Iannone [2012, Table 2.1]). Although the importance of drought to these discussions of collapse varies from extreme [Gill, 2000] to measured [Hodell et al., 1995], many of these arguments simplify or misrepresent archaeological data. Treatments of drought in relation to the Maya collapse also frequently neglect issues of human adaptability, variability, and agency (used here to mean the ability of people to act on the world around them). There is little doubt that droughts of varying scale and intensity were important factors in ancient Maya life, but continued collaboration between environmental

scientists and archaeologists is needed to better align the climate data with the archaeological evidence.

The idea that drought caused a number of crises in Maya society has been espoused most influentially by the archaeologist Richardson Gill in several publications including his book "The Great Maya Droughts" [2000]. Gill's ideas, like those of Jared Diamond [e.g., Diamond, 2005], have become influential beyond academia in part because they present a tidy and dramatic narrative. In a 2001 British Broadcasting Corporation documentary that sums up his argument, Gill is presented as a maverick, bucking the skepticism of closed-minded archaeologists who, like me, argue that his conclusions about the Maya collapse are simplistic. Nevertheless, long-lasting droughts are now routinely cited as the established driving factor in a supposedly pandemic Maya collapse, reaching fields outside of archaeology and in overviews presented in important scientific contexts [deMenocal, 2001]. The overall impact of this popular and scientific interest is that the influence of drought on the ancient Maya has now been investigated by a large number of archaeologists and scientists in other fields. The results of these investigations are surely important and provocative, but they are by no means definitive or clear.

2. THREE KEY POINTS

In the introduction to an edited volume about what is now generally called the Maya drought hypothesis [Aimers and

Iannone, 2012], Gyles Iannone and I discuss what archaeologists now know about the long sweep of Maya and Mesoamerican prehistory. For the diverse readership of the present volume, three points are especially relevant.

2.1. *The Dynamic Model*

First, the story of ancient Maya civilization is not a simple evolutionary progression from growth to death. Maya and Mesoamerican states continually oscillated between periods of integration and disintegration, florescence and collapse, and this is characteristic of states in general. Joyce Marcus calls this the “dynamic model” of Mesoamerican cultural development [Marcus, 1989, 1992, 1994, 1998].

2.2. *Maya Diversity, Not Unity*

Second, the Maya were never a single unified state and nothing like an empire, as they are sometimes called in the nonarchaeological literature on Maya drought [Webster et al., 2007]. Maya civilization consisted of a patchwork of city-states of varying sizes and influence in varied physical environments (some much drier than others, e.g., the northern lowlands), jostling for power in complex ways that are at least partially discernible as hieroglyphic decipherment continues. By the Classic period (circa A.D. 250 to 800) (see Table 1), we see kings and courts with intrigue and treachery worthy of Shakespeare, but also tiny rural villages [Sharer and Traxler, 2006]. Even today, 7 million or so living Maya speak 31 languages and exhibit significant cultural diversity [Campbell and Kaufman, 1985]. The idea of a homogenous and unified Maya is a colonial and postcolonial fiction [Grofe, 2005; Sachse, 2006].

2.3. *Terminal Classic Cultural and Temporal Variability*

Third, the idea of the Maya collapse, like the idea of the Maya, is a simplification. In previous publications [Aimers, 2004, 2007], I have discussed the bewildering variability of

the Terminal Classic period. To summarize: some sites and even regions did indeed exhibit what can reasonably be called collapse in the form of rapid abandonment. Other sites and regions, however, show nothing of the sort. I work at one of these sites: Lamanai, in northern Belize (Figure 1). While sites as close as Colha, 60 km away, were in turmoil as evinced by remains such as skull pits and site abandonment [Barrett and Scherer, 2005], Lamanai undertook one of the most ambitious construction programs in its history and the site, like some others in the Maya world, was a thriving city in the subsequent Postclassic period (circa A.D. 900–1540) [Pendergast, 1985]. Lamanai, like the sites of Tayasal and Tipu, was an important Maya center right up to the seventeenth century. Tayasal is just one of several sites in the Petén Lakes region that was occupied throughout the Postclassic period.

The Terminal Classic collapse is typically dated from about A.D. 800 to 1000, but the great temporal variability that has been revealed archaeologically complicates simplistic narratives of Maya florescence and collapse. This important fact is often ignored by nonarchaeologists, probably because they are using outdated overviews of Maya prehistory, which place the collapse entirely in the ninth century, a notion based mostly on early research in the central Petén region at sites like Tikal. We now know that sites in the Petexbatun region of Guatemala (e.g., Dos Pilas and Agua-teca) were abandoned as early as the mid-eighth century [Demarest, 2004], while others such as Chichen Itza (located in the relatively dry northern lowlands) were not abandoned until the mid-eleventh century [Cobos, 2004], and in the Mopan Valley of Guatemala, the Terminal Classic may extend into the thirteenth century [Laporte, 2004]. Another major problem relevant to this issue is the imprecision of many archaeological dating techniques including radiocarbon dating and ceramic chronologies, and the difficulty of aligning these with paleoclimate data sets [Yaeger and Hodell, 2008].

3. WHAT IS COLLAPSE?

Is it reasonable to call a process of abandonment a collapse if it did or did not happen, over a period of 400 years or more? Aimers and Iannone [2012] reviewed various definitions of collapse, and there is variability in those, too. We believe a collapse should involve a significant loss of sociopolitical complexity over a relatively rapid period of time, but what is “significant” and what is “rapid” are dependent upon scale. A slow collapse of a city might take 100 years, but for a civilization, this would be considered rapid by many people. We should probably abandon the term collapse for the events of the Terminal Classic, but the term is now so

Table 1. Basic Maya Chronology^a

Period	Time Frame
Postclassic	A.D. 900–1500
Terminal Classic	A.D. 800–900
Late Classic	A.D. 600–800
Early Classic	A.D. 250–600
Late Preclassic	250 B.C. to A.D. 250
Middle Preclassic	1000 – 250 B.C.
Early Preclassic	2000 – 1000 B.C.

^aThere are many versions for different sites and regions.

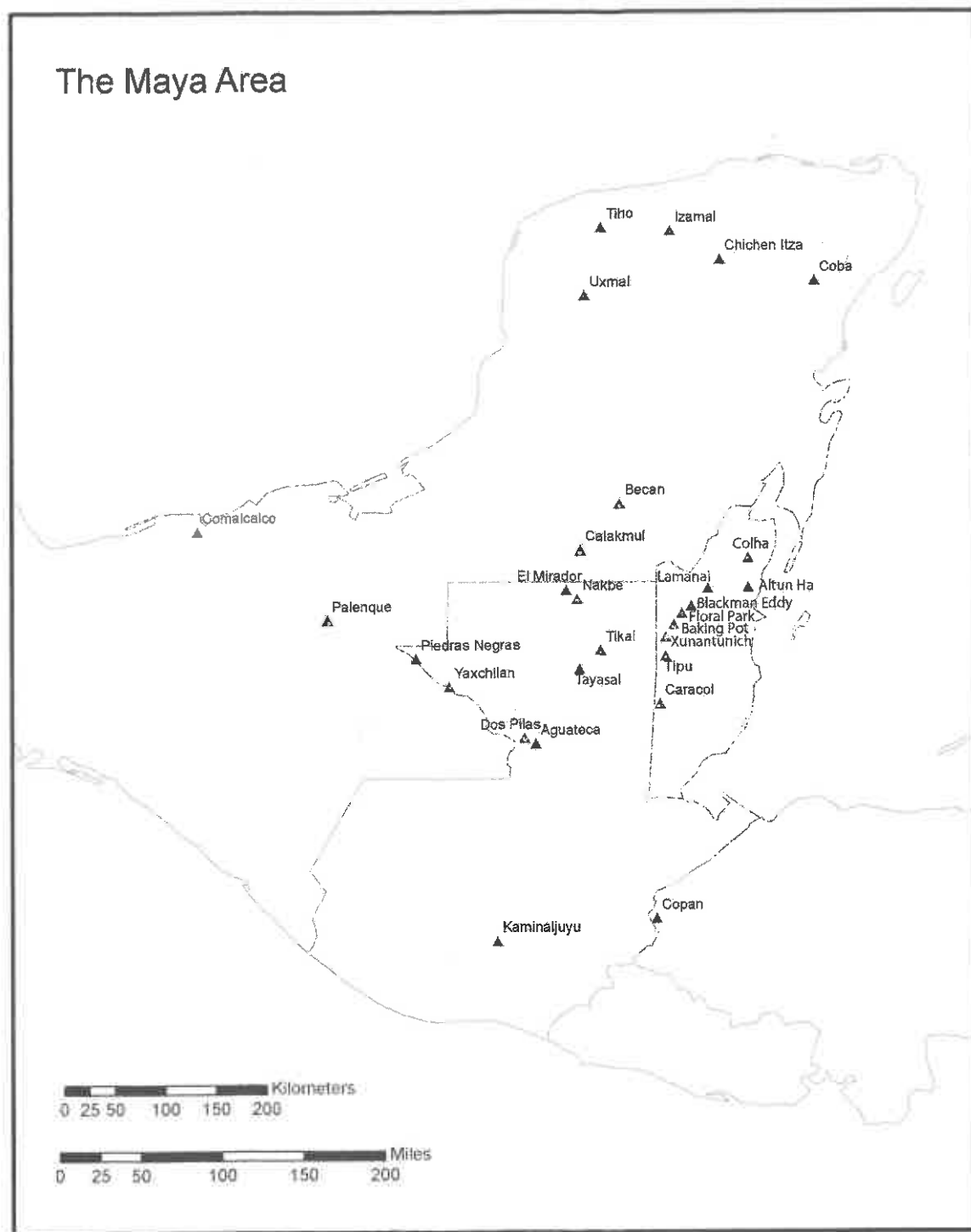


Figure 1. Maya area major sites and sites mentioned in the text. The site of Tikal, in the central Maya area, is located at 17.2219°N, 89.6228°W. From *The Electronic Atlas of Ancient Maya Sites*. © copyright 2008 Clifford T. Brown and Walter R. T. Witschey.

established in the literature that many Mayanists now use it simply as a sort of shorthand for the Terminal Classic period. Even if the term is ill-advised, it is entrenched, and anyone writing about the Maya collapse should be clear about what they mean by collapse and the scale under consideration. What actually collapsed: a polity, a federation or alliance, an empire, a society, a tradition, or a civilization? This is often not specified.

4. WHAT IS DROUGHT?

The number and variety of definitions of collapse pale in comparison to the many definitions of drought, yet scholars in various disciplines often neglect to state which one they are using when discussing Maya drought. In an often-cited article, *Wilhite and Glantz* [1985, p. 118] reviewed 150 definitions of drought and concluded that "there cannot (and should not) be a universal definition of drought." Wilhite and Glantz created a four-part typology of drought, showing that it can be defined (1) *meteorologically* by changes in precipitation, (2) *hydrologically* based on changes in lakes and streams, (3) *agriculturally* based on insufficient water for plant growth, (4) or *socioeconomically* in terms of the impact of decreased water supplies on the supply of goods. *Wilhite and Glantz* [1985, p. 114] specifically point out that meteorological drought, which is what environmental scientists can best detect, does not always coincide with agricultural drought, which is what would have been relevant to the ancient Maya and is of interest to archaeologists when discussing the events of the Terminal Classic. One of their conclusions is that "... weather, or drought, affects far more than just crop yields and ... social factors can be equally significant in determining society's vulnerability to drought and, thus, the type and magnitude of drought impacts." [*Wilhite and Glantz*, 1985, p. 116] This highlights the importance of considering both environment and agency in discussions of drought and the Maya collapse.

5. ENVIRONMENT, ADAPTATION, AND AGENCY

Dualisms have been strongly marked in Western scholarship since at least Descartes and are exemplified by the distinction between the so-called "hard" physical sciences compared to the social sciences as well as differential emphasis on agency (the human ability to act on the world) and structure (patterns or processes that restrict choice) in interpretations of the human past. Those in the sciences such as geology tend to emphasize structure and external forces because they are trained to seek patterns that may approach or may even be laws. Paleoscientists also tend to be interested

in long-term statistical relationships at very large scales and tend to favor "elegant" explanations (i.e., ones with few variables). In the last 50 years, many archaeologists have attempted to model archaeology on the natural sciences, and there has been a corresponding tendency toward external, structurally oriented explanations such as climate change. There has always been, however, a strong countervailing appeal in archaeology to interpretations of the past which stress the agency of human actors despite the constraints or challenges posed by structures of all sorts (social, environmental, political, etc.). In archaeology, these tensions have played out in what are called Processual and Postprocessual method and theory. Most archaeologists today accept the constraining effects of the physical environment, but also recognize that humans respond to these constraints in active and varied ways. This is not just a result of a theoretical trend; it has been documented archaeologically.

In the case of drought, climate scientists generally emphasize factors beyond human control (usually rainfall), but for most archaeologists, it is strange to see that they often fail to consider that one of the conditions associated with drought could be people and what they do. For me, this leads to two more points. First, if there is evidence of drought, was it natural or anthropogenic? In some cases, increasing aridity has been caused by increased population, agricultural overproduction, and deforestation. If this leads to abandonment, is it not clearer to say that abandonment was linked to overpopulation and deforestation rather than drought, since drought at least implies, to most people, natural causes? Second, just as we must be more explicit about how human activities might cause drought, we must consider human responses to drought. Much of the existing literature on drought in the Maya lowlands ignores human agency almost entirely. *Gill et al.* [2007, p. 299] exemplify this in typically dramatic fashion: "There was nothing they could do or could have done... and they died." This may have been true in some times and places, but it simply does not correspond to the evidence from about a century of research in the Maya lowlands.

6. THE TERMINAL CLASSIC COLLAPSE

Archaeologists use the term "horizon" to describe a phenomenon with a broad geographical distribution over a relatively short period of time. The Terminal Classic period cannot be considered a collapse horizon because it involved site abandonment at different times in different places, and it frequently did not involve abandonment at all. Even within the small area of what is now Belize, abandonment happened within a few generations (e.g., at the site of Xunantunich) [*LeCount et al.*, 2002], sometimes over centuries (e.g., at

Santa Rita) [Chase and Chase, 1988], and sometimes it did not occur at all (e.g., at Tipu) [Jones et al., 1986]. This temporal variability is detectable even in smaller, comparatively homogenous landscapes like the Usamacinta River basin (e.g., the sites of Piedras Negras and Yaxchilan) [Scherer and Golden, 2012].

Although debate about the details continues, a consensus is emerging among Mayanists that drought alone is not enough to explain the abandonment of Maya sites. No one doubts that devastating droughts occurred in Maya prehistory, as they have historically, but if we fail to consider and seek out the cultural response to drought, we come close to environmental determinism. Lamanai prospered during the Terminal Classic as Altun Ha, only 40 km away, was abandoned. Proponents of drought point to Lamanai's location on the New River but many sites on rivers were abandoned, including sites on other large rivers like the Belize River and the Usumacinta. In western Belize, riverine centers occupied into the Postclassic include Baking Pot on the Belize River and Tipu on the Macal River, but the other excavated sites were abandoned (e.g., Blackman Eddy, Floral Park). There does not seem to be a direct correlation between access to water and survival through the Terminal Classic; other factors must have been involved.

This emerging consensus on the dramatic changes of the Terminal Classic is not only important in itself but also because Gill and others [deMenocal, 2001; Rosenmeier et al., 2002; Webster et al., 2007] have extended the drought hypothesis to a number of periods in Maya prehistory in which evidence of decline is much more debatable. For example, much has been made of a supposed sixth century Maya hiatus, which some call a collapse. Archaeologists are now in general agreement that there was no Maya hiatus for the lowlands as a whole. There was a gap in monument dedication at some sites that we are now confident was linked to political instability, and the timing of these gaps varied considerably [Moholy-Nagy, 2003]. There is, in fact, very little evidence that drought played a role in the varied hiatuses and no evidence that we know of from the centers themselves. Nevertheless, author after author uncritically accepts the hiatus as a pervasive crisis in the Maya region, often simply by citing Gill's book or his outdated sources, rather than referencing a growing literature that questions the very existence of a Maya hiatus. There is no room here to even address widely repeated ideas about supposed Pre-classic and Postclassic period Maya collapses except to say that the disconnection between researchers in the physical sciences and archaeology is notable in these cases. It may not be fair to ask climate scientists to keep up with a large and rapidly changing literature on the Maya, but closer interdisciplinary consultation is clearly warranted.

7. PROXIMATE CAUSES AND RESPONSES

Although sites were abandoned throughout Maya history and droughts certainly occurred, drought is not an explanation of the abandonment of a site; it may be one of the proximate causes, a condition that may foster abandonment, and drought is well-documented in only a handful of places (e.g., at Calakmul [see Gunn et al., 2002]). Archaeologists have always placed the people they study in the context of their physical environment, but the assumption that all human organizations react in the same way to challenges presented by their environment ignores what archaeologists, historians, and anthropologists know about cultural variation and adaptation. Agricultural innovation, population movement, as well as social, economic, and political change are just some of the strategies Maya groups may have used to adapt to drought. Although such strategies may not always have been successful, people would have reacted as knowledgeable and strategic agents, not like plants or animals.

Economic and political factors are high on the list of elements we must consider when considering the differential changes of the Terminal Classic, especially as evidence accumulates that climate change was characteristic of the era. Resource diversity would have favored some centers over others. Examples include aquatic resources in addition to hunting and agriculture for food as at Lamanai or valued resources for trade as in the case of cacao at Tipu [Muhs et al., 1985]. Less centralized political organization and more sharing of power may also be characteristic of the Terminal Classic (e.g., at Chichen Itza), and this may have facilitated more nimble responses to crises than possible in the more hierarchical systems characteristic of the Classic period.

8. CONCLUSION

As early as 1973 in *The Classic Maya Collapse*, Andrews IV [1973, p. 243] pointed out that there was no collapse of the Maya as a whole, and since then, many people have documented the temporal, spatial, and cultural variation of the Terminal Classic [Aimers, 2007; Demarest et al., 2004; Marcus, 1998; Webster, 2002]. Still it has been nearly impossible to dispel the myth of a pandemic Maya collapse among academics and the general public. The drought hypothesis, especially in its extreme forms (e.g., Gill's work), is just the most recent of many attempts to find order in the chaos of the Terminal Classic archaeological record. As such, it says as much about our contemporary concerns about climate change and the appeal of an easily identifiable explanation as it does about the lives of the ancient Maya. The Maya lowlands were diverse enough that Mayan speakers from different regions would have not been able to understand

one another's languages, and we have evidence of significantly different customs and traditions across the area, as is the case today. The environmental diversity of the Maya lowlands is also considerable and extremely relevant to all-encompassing ideas about the impact of drought.

Overall, I would like to see the notion of the Maya collapse (whether in the Preclassic, Middle Classic, Terminal Classic, or Postclassic) shoveled into the backdirt pile. Aside from the fact that it is inaccurate, it perpetuates the idea that the Maya "mysteriously" vanished or that they were incapable of adapting to environmental crises. This further disconnects the living Maya, who may in fact be more unified today than ever before, from a past that can be a source of pride and power [Bastos, 2006]. The task ahead of us is to compare localized data sets from across the Maya world, work on our chronological correlations, and consider how the Maya in different environments may have responded to drought where it is evident. I would like to encourage readers working in climate science, on the issue of ancient drought, to more fully engage with current research by archaeologists working in the field, rather than uncritically repeating ideas that are out of date, speculative, or demonstrably wrong. All of our research will be stronger with this sort of collaboration, and I am happy that the American Geophysical Union conference from which this volume derives shows that this is already happening.

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